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ABSTRACT

This paper presents, in question-and-answer format, a discussion of the complexities and implications of physical education theory and suggestions for applying this knowledge to the development of physical fitness programs in Canadian schools. The questions consider: (1) the need for physical exercise; (2) definition of physical fitness; (3) basic principles of fitness development; (4) performance- and health-related components of physical fitness; (5) types of activities included in developmental fitness programs; (6) the role of physical fitness testing; (7) the role of schools in fitness development; and (8) promoting physical fitness through school activities and environment. (FG)

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UNDERSTANDING FITNESS:

A PRIMER FOR SCHOOL PROGRAM PLANNERS

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UNDERSTANDING FITNESS:

A PRIMER FOR SCHOOL PROGRAM PLANNERS*

Canadian children are unfit! Current school physical education programs do very little to alter this situation. Bailey (1973) has stated:

> For the ordinary Canadian child physical fitness . . . seems to be a decreasing function of age from the time we put him behind a desk in our schools (p.425).

Bailey's (1973) and Goode's (1976) findings are formidable condemnations of attempts at fitness development in current school physical education programs. The neglect of programs in the fitness area becomes even more imposing when one considers that many of the major health problems in Canada, such as coronary heart disease, lung cancer, obesity, and back problems may be considered diseases of choice. The responsibility for the prevention of these lifestyle-related health problems rests with each individual. It is one of a physical education teacher's functions to motivate every young Canadian to become concerned about his/her lifestyle and to stimulate him/her to do something about it.

With this in mind, this paper will focus on three aspects of physical fitness necessary for physical educators to carry out the aforementioned function: (1) an understanding of the complexities of physical fitness theory; (2) its implications; (3) and suggestions for the application of this understanding. The discussion will take the form of answers to common fitness inquiries. Understanding of the principles, implications, and applications included in the ensuing discussion should aid in the development and maintenance of fitness programs essential for each youngster to have a good start in enjoying positive health throughout life.

Why Physical Exercise?

Physical exercise is necessary for each youngster because it is essential for the growth of body tissue, organs and bones (Espenschade, 1967). In the past, this need was met by the ongoing struggle for survival. However, in more modern times, machines have replaced much of what was once

accomplished by muscle power. Today, each youngster must actively seek an adequate amount of exercise if he/she is to expose his/her heart, circulation, muscles, skeleton, and nervous system to conditions conducive to maximal physical development.

In addition to organic soundness, participation in various, vigorous activities can be valuable to an individual's general effectiveness. Research has indicated that this value is related to mental achievement, personal-social status and motor/athletic abilities (President's Council, 1976).

What is Physical Fitness?

Over the years, a somewhat universal definition of physical fitness has evolved. It is generally referred to as that condition of the body necessary in order for a person to carry out his daily tasks without undue fatigue, yet have enough energy to pursue leisure activities and meet emergency situations that require additional exertion (Astrand, 1970).

This definition implies that physical fitness is a positive quality. It is more than just "being well". Everyone has some degree of physical fitness; it is minimal in the severely ill and maximal in the highly trained athlete. The key to fitness for each youngster is that he/she must be able to cope with his/her ordinary environment. A youngster can be assured of achieving this goal only if he/she is knowledgeable and active enough to create and maintain a large reserve of energy in the form of a high fitness level. Aid and direction in this endeavour must come from the physical education program.

What are the Basic Principles of Fitness Development?

There are cettain basic principles one must comprehend if a working knowledge of physical fitness is to be developed. Provision should be made for all youngsters to be made aware of and experience the following principles in their physical education programs:

1. Principle of Homeostasis. By its very nature the human body attempts to maintain a constant internal environment. When this environment is upset, the body adapts to handle the upsetting.

agent. This concept can become meaningful for a youngster by using a house thermostat as an example and by such questions and activities as follow. What happens when a house gets cold? What happens when a house gets warm? What happens to our body when we get cold? What happens to our body when we get warm? What happens to our heart rate when we run? In all instances an adaptation will take place in order to maintain a constant internal environment. The thermostat will cause the furnace to go on or off, the body will shiver or sweat, and the heart rate will increase.

2. Principle of Chronic Adaptation. When the human body is regularly confronted with an upsetting agent it has the ability to alter its structure and/or function to better handle the upsetting agent. For example, it is common knowledge that regular exposure to jogging (exercise is a potent upsetting agent) will increase the size and strength of the heart muscle, improve blood flow and improve the efficiency of breathing. A youngster can experience this concept by taking his pulse rate before and after a regular bout of exercise (e.g. running up a flight of stairs) over a period of weeks. In time he/she will discover that running up the same flight of stairs that originally raised the heart rate to 180 beats/minute eventually only raises it to 130 beats/minute. His/her body has adapted so it can better handle the run up the stairs (the upsetting agent).

3. Principle of Adequate Stimulus. To increase levels in any of the various fitness components, the overload principle must be applied. The number of times, tempo, or resistance offered in a fitness work bout must be increased if gains are to be made. The stimulus, in the form of exercise, must be adequate to cause an adaptation. Small upsets in homeostasis are lightly regarded and easily tolerated and no adaptation is likely to occur. This concept can be experienced by having a youngster perform moderate exercise, then answer such questions as follow. Is there any change in the heart rate? Why? Hopefully, the youngster will arrive at the conclusion that there was little change in his/her heart rate because the stimulus

was not adequate to have a conditioning effect.

In addition, youngsters should be provided, usually through discussion with an opportunity to internalize the concept that a very heavy training stimuli (e.g., running too far, too fast, or too long) can be counter-productive in developing fitness. In fact, it may lead to chronic exhaustion and physiological and structural damage that could actually hamper fitness development. However, it should be noted that it is difficult to make demands on the body of a healthy youngster that could not be coped with during the limited time available in most physical education programs (Corbin, 1980).

Fitness must be developed by taking part in activities that will cause alterations but that will not be so severe as to hamper fitness development. An adequate stimulus, in the form of exercise, can be achieved by learning to alter the intensity (how hard), duration (how long), and frequency (how often) of the activities one follows to reach a desired fitness level.

4. Principle of Specificity. An individual must condition specifically for the goals he/she hopes to achieve. For example, if a youngster has a desire to improve strength and flexibility levels, then he/she must take part in strength and flexibility work. The principle of specificty holds true for both health and performance-related components of physical fitness (these are discussed later in the paper).

5. Principle of Use and Disuse. Exercise promotes growth and cessation of exercise results in atrophy or retardation of growth. Exercise must be performed consistently and regularly. If practices cease, strength and endurance are lost almost as quickly as they were gained.

6. Principle of Individual Differences. Each youngster improves in fitness at his/her own rate due to such factors as age, body type, nutritional status, weight, health status, and motivation. Each youngster will respond to a fitness program in a manner that is

peculiar to his/her own environment and hereditary characteristics. Physical education teachers as well as the youngster should be aware of this in their discussion and program planning toward fitness.

What are the Components of Physical Fitness?

Corbin (1980) divides fitness components into two broad categories and this author's thoughts are based on an adaptation of this work. The components of physical fitness can be divided into four health-related components -- muscular strength, muscular endurance, circulatory-respiratory endurance, flexibility and five performance-related components -- coordination, speed, power, agility, balance. The division between health-related and performance-related components may, at times, seem fine. Performance-related components aid one's performance in athletic activities but really have very little bearing on one's health and fitness level. On the other hand, health-related components not only improve one's health but one's performance in athletic activities. With this distinction in mind, it appears obvious that concern and programs for children should be biased toward the health-related components of physical fitness.

Because of nomenclature, the five performance-related components are self-explanatory. Since our major concern rests with the health-related components, a closer examination of them is necessary. In order to facilitate later discussion, these components are defined as follows:

1. Circulatory-respiratory endurance is a specific form of endurance that is primarily concerned with the heart, blood vessels, and lungs.
2. Muscular strength is the amount of force that can be exerted by a single muscle or muscle group in a single maximum effort.
3. Muscular endurance is the ability to do sustained work with a specific muscle group.
4. Flexibility refers to the range of motions in one or more joints.

What Should be Included in Developmental Fitness Programs?

Most of the standard activities include in current physical education programs offer development in the performance-related components of fitness. These programs often fall short in the health-related components and it is in this direction that some effort should be exerted. Although the nature of the activities that will result in increases in either performance or health-related components need not necessarily be different, the way in which they are presented must vary. If fitness is to be a primary concern, then activities must be presented in accordance with the basic fitness principles discussed earlier. With this in mind we can examine specific suggestions for improving fitness levels in youngsters.

In order to improve muscular endurance, a youngster must increase the number of repetitions of a movement. If he/she wishes to increase strength, the youngster does not increase the number of repetitions but does increase the resistance. Muscular strength and endurance will result if one is exposed to activities that offer strong resistance to muscles. Resistance can be supplied by parts of the body (calisthenics), inanimate objects, body weight (climbing activities), and other people (tug-of-war, combatives).

The basic forms of exercise for developing circulatory-respiratory endurance are those which involve self-propulsion of the body over a distance. The propulsion should be sufficiently severe and prolonged so as to require a definite adjustment of the circulation and respiration to the effort. Particularly desirable forms of exercise for school use are running, jogging, swimming, cross-country skiing, fast walking, stair climbing, vigorous dancing, rope skipping, bicycling and orienteering. Many sports also have a high endurance potential, including soccer, field hockey, speedball, ice hockey, basketball and other sports requiring sustained running. It should, however, be kept in mind that sufficient skill in a sport is needed to permit endurance development. Many youngsters do not possess the necessary skills.

Other more informal activities for youngsters that have the potential to improve circulatory-respiratory fitness are relays, obstacle courses,

and informal games such as tag. In addition, many recognizable and widely used games can easily be modified to make them more fitness oriented.

Flexibility can be improved by a series of isometric contractions of the muscles to be stretched, followed by concentric contractions of the opposite muscle group supplemented by light pressure from a partner (Holt, n.d.). These slow stretching exercises appear to be more desirable in developing flexibility than the jerking, bouncing, and bobbing stretching exercises often evident in school programs.

What is the Role of Physical Fitness Testing?

Testing is an important part of any fitness program because it enables the teacher to determine the physical status of each student, identify youngsters in need of special help, measure progress, and carry out more meaningful program planning. However, it should be kept in mind that fitness testing below the fourth grade is not generally recommended (Vanier, 1973; Schurr, 1975; Burton, 1977). Primary children do not always exert themselves, their attention is easily diverted and they often become curious about the test itself, the tester, and the measuring instrument.

It is also interesting to note that Corbin (1980) reports that adolescent girls "could perform well [in physical fitness tests] if they would". He attributes their decreased performances to motivational factors of social origin. This is something that physical educators should work to overcome when developing fitness programs.

There are a number of very sophisticated testing procedures for the various fitness components. These specialized tests are seldom used in schools because they are expensive, time consuming, and require trained testers. Motor fitness tests (conglomerates involving a number of fitness components) are the tests most commonly used in schools. These tests are prevalent because they can be administered to large numbers of students in short time periods and with minimal equipment and testing expertise.

The motor fitness test most widely used in schools throughout Canada is the CAHPER Fitness-Performance Test, designed to test muscular strength

and endurance of the abdomen, leg power, agility, arm and shoulder endurance, speed and circulatory-respiratory endurance. This test has national percentile norms for boys and girls aged 7 to 17 and is an acceptable part of the motivational and evaluative processes of numerous schools.

It is interesting to note that the AAHPERD Physical Fitness Test which is the American equivalent and quite similiar to the CAHPER Fitness-Performance Test has a special task force working to revise it. The intent is to make it one which truely emphasizes the health-related aspects of fitness (Falls, 1978).

One must conclude any discussion of fitness testing with a word of caution. Labelling a youngster as a superior, average, or poorly fit individual has been a most malignant educational practice. A more logical approach is to diagnose a youngster's fitness capabilities, place him/her on the appropriate level of the developmental sequence, then treat him/her as an individual who has a good chance to be successful in what is being attempted. An individualized approach will allow each youngster to achieve success that will hopefully produce a "success syndrome" which, in turn, will aid in the development of a positive self-image in the area of physical fitness. And after all, a positive self-image is by far the most important measure of a youngster's achievement in physical fitness.

What is the Role of the School in Fitness Development?

One of the biggest stumbling blocks to developing fitness in our current school programs is time. Rarick (1964) has stated that,

> . . . observations of pre-adolescent school age children indicated that they need four to five hours of physical activity each day . . . (p.109).

In actuality, the majority of Canadian elementary schools schedule only two classes of physical education per week (C.A.H.P.E.R., 1976). This obstacle of time is not likely to be overcome in the near future and physical educators should look to other vehicles to supplement the class program in fitness development.

Although junior and senior high schools generally have more time available they often opt for isolated "fitness units" rather than a fitness curriculum that is sequential, progressive, and cumulative. Too many current fitness programs do not have the facility to grow with the students.

A faulty assumption often made is that the sole role of physical education is to provide and structure activities that will develop fitness. This is a narrow and unrealistic expectation in our current educational system. Rather than limiting themselves to the provision of fitness oriented activities, it is more important that physical educators accept the responsibility for developing and encouraging a positive attitude toward the importance of fitness in their pupils.

A positive attitude toward fitness can best be gained through a sound and enjoyable developmental program. It must be remembered that isolated exercises are not the only means of developing fitness. In fact, it is possible that isolating a specific part of the lesson as fitness exercise time may be more harmful that helpful. Youngsters must realize that play activities they enjoy have the same fitness development potential as isolated exercises. It is up to the physical education teacher to be judicious in the planning, selection, and presentation of activities if he/she hopes to develop positive attitudes and aid in the fitness development of his/her pupils. As Schurr (1975) has stated, all activities in a physical education program can

> . . . be planned in a progression and sequence where all muscle groups of the body are challenged and the tempo and intensity of them are altered to a challenging point for each child according to his needs (pp. 219-220).

How Can Physical Fitness be Promoted in the School?

The following suggestions may be helpful for the promotion of physical fitness and the creation of an atmosphere where the value of physical fitness can be stressed:

1. The physical education teacher should be a model of physical fitness.
2. A physical fitness poster campaign should be carried out in each school.

3. Fitness clubs such as "jogging clubs" should be established.
4. Fitness goals should be established for each youngster.
5. Fitness work should be incorporated with activities of a national interest such as the Olympics, Universaide and Commonwealth Games.
6. All academic and non-academic personnel should be involved in the fitness program whenever possible.
7. Every attempt should be made to develop parental concern for the fitness of their children. This can often be achieved by means of talk and film presentations, school newsletters, and special fitness report cards.

Summary

Historically, physical fitness was a major part of the physical education program. More recently, the development of motor skills, improvement of social and emotional characteristics, and acquisition of concepts and appreciations are the focal points of physical education programs. This new focus need not be detrimental to fitness development.

As has been pointed out, fitness cannot be developed solely in the school physical education program with its limited time allotment and emphasis. Individual fitness will result for each youngster in the many activities he/she participates in after school and on weekends. In what activities will a youngster participate outside of school? Those in which he/she has developed interest and sufficient skills to enjoy. Hopefully, all physical education programs will allow every youngster to develop sufficient interest and skills in activities with fitness potential. This will place physical fitness in its proper perspective. As Miller and Whitcomb (1969) so aptly stated, ". . . it becomes a result rather than a means (p.8)."

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